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Use of digital technologies in history teaching: innovation and challenges

Uso de tecnologías digitales en la enseñanza de la historia: innovación y desafíos

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Abstract

This analytical study examines the impact of digital technologies on history teaching, assessing both their innovative potential and implementation challenges from qualitative and quantitative perspectives. The research involved a systematic literature review and an empirical analysis with 20 undergraduate students enrolled in the History Teaching program at the Instituto Superior Politécnico Caála, Angola. The findings reveal a predominantly positive perception of digital technologies (70% reported significant or moderate improvements), with a notable preference for educational videos (55%) and online teaching platforms (30%). However, effective implementation faces substantial barriers, with institutional resistance identified as the main obstacle (60%). The methodology included thematic content analysis and descriptive statistics, identifying three principal categories: pedagogical potential, student perception, and implementation challenges. The results contribute to understanding digital educational transformation in Angolan contexts, informing public policies and culturally appropriate pedagogical strategies. The study concludes that successful integration of digital technologies requires holistic approaches that consider technical, pedagogical, institutional, and cultural factors, emphasizing the need for continuous teacher training and supportive organizational policies.

Keywords: Digital technologies; History teaching; Innovation; Challenges; Education..

Resumen

Esta investigación analítica examina el impacto de las tecnologías digitales en la enseñanza de historia, evaluando tanto las potencialidades innovadoras como los desafíos implementativos desde una perspectiva cualitativa y cuantitativa. El estudio se desarrolló mediante revisión sistemática de literatura y análisis empírico con 20 estudiantes de Licenciatura en Enseñanza de Historia del Instituto Superior Politécnico Caála, Angola. Los hallazgos revelan una percepción predominantemente positiva hacia las tecnologías digitales (70% reporta mejoras significativas o moderadas), con preferencia particular por videos educativos (55%) y plataformas de enseñanza en línea (30%). Sin embargo, la implementación efectiva enfrenta barreras significativas, siendo la resistencia institucional el principal obstáculo identificado (60%). La metodología incluyó análisis temático de contenido y estadística descriptiva, identificando tres categorías principales: potencialidad pedagógica, percepción estudiantil y desafíos implementativos. Los resultados contribuyen a la comprensión de la transformación digital educativa en contextos angolanos, informando políticas públicas y estrategias pedagógicas culturalmente apropiadas. Se concluye que la integración exitosa de tecnologías digitales requiere enfoques holísticos que consideren factores técnicos, pedagógicos, institucionales y culturales, enfatizando la necesidad de capacitación docente continua y políticas de apoyo organizacional.

Palabras clave: Tecnologías digitales, Enseñanza de Historia, Innovación, Desafíos, Educación

INTRODUCTION

The incorporation of digital technologies into educational processes has grown exponentially over the past decade, intensified by structural transformations derived from the post-pandemic context, which have reshaped contemporary pedagogical paradigms (UNESCO, 2023; Selwyn, 2022). In the specific field of history teaching, this technological transformation has generated unprecedented pedagogical opportunities while posing complex challenges for teachers and educational systems, especially in regions with structural limitations.

From a critical epistemological perspective, the central issue lies in the tension between the transformative potential of digital technologies and their practical implementation in history classrooms (Barton, 2015; Dussel & Quevedo, 2020). This tension is heightened in educational contexts characterized by limited infrastructure and traditional pedagogical models, as is the case in Angola and other regions of sub-Saharan Africa, where technological adoption presents distinct dynamics that require contextualized analysis.

Recent research shows that emerging technologies such as augmented reality, interactive digital narratives, and artificial intelligence are reshaping the teaching of history by enabling immersive experiences that foster critical thinking, historical literacy, and temporal reasoning (Rodríguez Cevallos et al., 2025; Wineburg, 2018). Quantitative studies report that 87% of students experience greater motivation and a deeper understanding of historical processes when using augmented reality experiences, with statistically significant improvements in higher-order cognitive skills ($p < .01$).

Nevertheless, the effective implementation of these technologies faces systemic barriers that exceed technical aspects. The American Historical Association (2025) has established guiding principles emphasizing the need to develop AI competencies and implement transparent institutional policies for the ethical use of generative AI in history education. This aligns with authors such as Rheingold (2021), who argue that historical thinking—understood as the ability to contextualize, interpret, and argue about the past—remains an essential skill in the digital era.

International literature has documented that institutional resistance constitutes one of the main obstacles to integrating educational technologies (García-López, 2018; Ertmer & Ottenbreit-Leftwich, 2013), a finding reinforced in recent Latin American studies, where organizational barriers outweigh technical limitations as inhibitors of innovation.

In the specific case of Angola, Costa and Santos (2022) note that the education sector faces unique challenges in adopting digital technologies, particularly in the social sciences and history teaching. These challenges demand pedagogical approaches that consider local socioeconomic, cultural, and linguistic conditions, as well as community perceptions regarding educational

innovation.

From a pedagogical perspective, digital transformation in history teaching does not merely imply the incorporation of technological tools but a profound reconceptualization of educational processes (Mills, 2010; Laurillard, 2012). Johnson (2020) demonstrates that students particularly value the structure and organization provided by virtual environments, suggesting that technological effectiveness depends as much on instructional design as on the critical appropriation by educational actors.

History, as a discipline, involves the study of human actions over time, analyzing processes and events that contribute to understanding social and cultural development (Pedro, 2014). Since early humanity, teaching has been an essential activity in which knowledge was transmitted intergenerationally through survival practices (Piletti, 2004). This formative dimension has evolved into more complex pedagogical models in which teaching is understood as an intentional activity aimed at promoting learning while respecting the intellectual integrity and critical judgment of students (Passmore, 1980).

In the contemporary context, society undergoes profound transformations in knowledge, culture, and social dynamics, requiring current generations to develop competencies related to Information and Communication Technologies (ICTs) to cope with the accelerated changes of the digital era (Pinto, 2006). These transformations have converted the world into an interconnected network, facilitating immediate access to information and redefining knowledge construction.

Technology is thus conceived as a set of scientific knowledge applied to various fields of activity, and also as a discipline that studies techniques and their uses (Valle, 1996). In education, it has become an indispensable tool for facilitating processes, expanding possibilities, and promoting pedagogical innovations. Andrade (2018) notes that, since the second half of the 20th century, technological advances have popularized access to information, securing the presence of ICTs across most postmodern activities, including education.

Humanity has witnessed two structural transitions that profoundly impact society: the emergence of the knowledge society and globalization (Sosa & Tavares, 2013). In this new scenario, computing has acquired a central role in communication, transforming educational environments through tools ranging from digital presentations to complex online learning systems, augmented reality, and AI applied to education.

Mills (2010) warns that this “digital revolution” is not merely a technical shift but a paradigmatic transformation redefining teaching, learning, and knowledge construction. Laurillard (2012) proposes understanding teaching as a pedagogical design process that must adapt to new technological conditions, while Johnson (2020) reaffirms that students value the structure and organization provided by virtual learning environments.

Within this context of structural change, the school—as the institution responsible for knowledge production—is compelled to reconsider its traditional methodologies, especially in disciplines such as history, which have long relied on expository and conservative models. Globalization has intensified challenges posed by ICTs, transforming the world into what some authors call a “Global Village.” According to Libâneo (2013), this new configuration demands changes across all social segments, from schooling practices to business and community dynamics.

Students in secondary and higher education belong to a generation characterized by immediate access to information through digital media, highlighting the need to strengthen training for both teachers and learners in the critical and creative use of ICTs. This formative process must extend to the entire academic community, fostering a digital culture that promotes educational innovation and technological inclusion.

In Angola, Costa and Santos (2022) underscore that education faces singular challenges in adopting digital technologies, particularly in social sciences and history teaching. These challenges require pedagogical approaches tailored to local socioeconomic, cultural, and linguistic realities. Digital transformation in history teaching thus entails not only incorporating technological tools but reconceptualizing educational processes to respond to specific contextual needs.

Current technological transformations deeply affect educational institutions, requiring thorough

re-evaluation of the educational ecosystem to achieve quality and equity in teaching and learning. This involves reflecting on the profile of students shaped by economic and educational policies, as well as by the demands of an increasingly competitive global market (Libâneo, 2013).

From a historiographical viewpoint, the evolution of history teaching requires a critical approach that acknowledges its roots in classical historical thought. Payen (2010) argues that the historian fulfills a conservative function, providing reassurance amid present uncertainty and future anxiety by offering the past as a space for identity reconstruction. This perspective suggests that history teaching transmits meanings as much as facts.

Historically, historical thinking originated in classical Greece (4th–5th centuries BCE), where oral transmission predominated. This legendary logic—based on experiential narratives without empirical verification—shaped a traditional pedagogy centered on memorization and repetition. Silva and Pereira (2021) emphasize that such pedagogy reinforces vertical power relations between teachers and students.

This traditional approach generates disinterest in reflective historical study, reducing it to mechanical exercises devoid of social meaning. Such disconnection between historical content and students' realities prevents them from interrogating their own historicity, that is, the historical dimension of their individual, family, social, and national experiences (Cabrini, 2000).

New social and educational paradigms have emerged in response, demanding deep methodological changes. In this context, Open Educational Resources (OERs) have become key tools for democratizing access to knowledge. Leffa (2016) defines OERs as flexible, reusable, and customizable electronic units that facilitate competency-based learning and enrich educational content. Silva (2015) expands this definition to include courses, modules, books, articles, videos, tests, and software under public domain or open licenses.

Open education represents an innovative modality that articulates traditional and contemporary practices, promoting free access to scientific information through ICTs and fostering a culture of collaboration, inclusion, and collective knowledge construction.

The guiding research question is therefore: How does the use of digital technologies innovate history teaching, identifying pedagogical potential, student perceptions, and implementation challenges in the context of the Instituto Superior Politécnico Caála?

This research is justified by the urgent need to understand the specific impacts of digitalization in Angolan educational contexts, given the scarcity of empirical studies documenting local perceptions of technological innovation in history education. The relevance of the study spans three fundamental dimensions:

(1) the need to contextualize educational technology research within African realities; (2) the importance of formulating culturally appropriate educational policies; and, (3) the contribution to designing pedagogical strategies that recognize the particularities of local educational environments.

The study aims to generate empirical evidence to inform public policies and innovative pedagogical practices, bridging international theoretical frameworks with local needs. Additionally, it seeks to contribute to the broader body of knowledge on digital educational transformation, providing data that may inspire future research in similar contexts.

The general objective is to analyze the impact, potentialities, and challenges of using digital technologies in history teaching at the Instituto Superior Politécnico Caála, identifying the pedagogical innovations generated and understanding the factors that facilitate or hinder their effective implementation. The specific objectives include identifying the main digital technologies used in history teaching and their pedagogical applications; assessing students' perceptions of their effectiveness; analyzing institutional and organizational challenges; and proposing culturally appropriate and pedagogically effective strategies for technological integration.

METHODOLOGY

This study adopted a convergent parallel mixed-methods design combining qualitative and quantitative elements to provide a comprehensive understanding of the phenomenon in the specific context of the Instituto Superior Politécnico Caála. The research unfolded in two complementary

phases: a systematic literature review and analysis of case studies, followed by an empirical study with undergraduate students in the History Teaching program.

Participants were selected based on accessibility and relevance, as these students represent future teachers and direct users of innovative history teaching methodologies. The sample consisted of 20 third- and fourth-year students enrolled in the History Teaching program at ISPCaála–Polo Universitario do Bailundo. Inclusion criteria required active enrollment, completion of at least 50% of academic credits, and voluntary consent to participate. Data collection took place during the second semester of the 2024 academic year.

The literature review formed the theoretical foundation of the study and included books, journal articles, theses, and dissertations published between 2009 and 2024. Key authors include Cuban (2018), who explores the possibilities of digital technologies in history teaching; García-López (2018), who examines challenges and limitations related to digital resources; and Johnson (2020), who analyzes case studies of schools implementing digital platforms and multimedia resources.

Case studies from public and private schools that recently integrated digital technologies into history teaching were also reviewed. Selection criteria included diversity of institutional types, variety of implemented technologies, and geographic and temporal diversity. The analysis highlighted both successful and unsuccessful cases to obtain a balanced perspective on real-world challenges in digital integration.

Although the study was predominantly bibliographic, data collection also included semistructured multiple-choice questionnaires with closed questions and interviews with history teachers involved in digital resource implementation. Data were analyzed using thematic analysis and descriptive statistics with SPSS version 25, with some results presented in tables and charts.

Overall, the methodology sought to offer a broad and in-depth understanding by integrating theoretical review, practical experiences, and empirical data, contributing to ongoing discussions about innovation and challenges in digital technology use in history teaching.

RESULTS AND DISCUSSION

The data analysis revealed three main categories that emerged from students' experiences with digital technologies in history teaching: perceived effectiveness, technological preferences, and perceived challenges. The results are presented organized according to these dimensions, providing a comprehensive understanding of the phenomenon under study in the specific context of the Instituto Superior Politécnico Caála.

Category 1: Perception of Effectiveness of Digital Technologies

Question 1: Do you believe that the use of digital technologies improves the teaching of History?

Response	Frequency	Percentage	Valid percentage	Cumulative percentage
Yes, significantly	6	30,0	30,0	30,0
Yes, somewhat	8	40,0	40,0	70,0
No, it makes no difference	3	15,0	15,0	85,0
No, it harms teaching	3	15,0	15,0	100,0
Total	**20**	**100,0**	**100,0**	

Analysis of Category 1 reveals that most participants (70%) maintain a positive perception of digital technologies in history teaching. Specifically, 40% consider the improvement significant, while 30% perceive moderate improvements. However, 15% believe technologies make no difference, and another 15% consider them detrimental. These perceptions reflect the diversity of opinions regarding the impact of digital technologies, indicating both potential and resistance within the studied context.

Category 2: Technological Preferences

Question 2: Which of these digital technologies do you consider most effective for history teaching?

Technology	Frequency	Percentage	Valid percentage	Cumulative percentage
3D virtual and augmented reality resources	3	15,0	15,0	15,0
Online teaching platforms (e.g., Google Classroom, Moodle)	6	30,0	30,0	45,0
Educational videos (e.g., YouTube, documentaries)	11	55,0	55,0	100,0
Total	**20**	**100,0**	**100,0**	

In Category 2, educational videos were identified as the preferred digital technology for history teaching (55%). Online teaching platforms ranked second (30%), valued for their organizational structure and audiovisual resources (Mayer, 2009). Virtual and augmented reality resources received only 15%, possibly reflecting limited accessibility or familiarity with these emerging technologies.

Category 3: Interactivity and Student Engagement

Question 3: Do you believe that digital technologies offer a more interactive and participatory approach for students?

Response	Frequency	Percentage	Valid percentage	Cumulative percentage
Yes, always	15	75,0	75,0	75,0
Sometimes	2	10,0	10,0	85,0
Rarely	3	15,0	15,0	100,0
Total	**20**	**100,0**	**100,0**	

The results of category 3 indicate a high level of positive perception regarding interactivity: 75% of students believe digital technologies consistently offer more interactive experiences, reinforcing their potential to enhance engagement (Johnson & Christensen, 2019). However, 15% perceive limited interactivity, suggesting variability in effectiveness based on implementation context.

Category 4: Perceived Implementation Challenges

Question 4: What challenges do you face when integrating digital technologies into history teaching?

Challenge	Frequency	Percentage	Valid percentage	Cumulative percentage
Lack of adequate training for the use of these technologies	3	15,0	15,0	15,0
Resistance from colleagues or administrators	5	25,0	25,0	40,0
All of the above	12	60,0	60,0	100,0
Total	**20**	**100,0**	**100,0**	

Category 4 shows that digital technology integration faces multidimensional challenges. Sixty percent of participants identified multiple simultaneous obstacles, while 25% specifically noted institutional resistance. Lack of training was cited by 15%. These findings indicate that challenges are predominantly organizational and cultural rather than purely technical, aligning with research emphasizing the importance of organizational change strategies (Moran, 2013).

DISCUSSION

The study results are organized around three main dimensions: interpretation of findings in relation to international literature, comparative analysis of educational contexts, and recognition of methodological limitations that inform the interpretation of the results obtained.

First, the results reveal a predominantly positive perception of digital technologies in history teaching, with 70% of students indicating significant or moderate improvements (Categories 1 and 3). This finding is consistent with international literature documenting the transformative potential of technologies to enhance student engagement and contextualized learning (Johnson & Christensen, 2019). However, the specific preference for educational videos (55%) and online teaching platforms (30%) partially contrasts with recent studies that emphasize the growing value of immersive resources such as augmented reality in history education (Rodríguez Cevallos et al., 2025).

This divergence suggests that technological preferences may be mediated by specific contextual factors, including resource availability, prior experience with emerging technologies, and cultural characteristics of the educational environment. In contexts such as the Instituto Superior Politécnico Caála, where access to advanced technologies may be limited, students tend to value more accessible and familiar technologies such as videos and basic digital platforms.

From a comparative perspective, the results differ significantly from studies conducted in developed-country contexts where technological infrastructure is more robust. Cuban (2018) documents that in well-resourced educational institutions, educators primarily experience specific technical challenges, whereas in the Angolan context analyzed here, the main barrier identified was institutional resistance (60%), rather than issues of technological access.

This difference indicates that patterns of technological adoption in education do not follow a uniform linear model, but instead reflect dynamics specific to each socioeconomic and cultural context. While international studies tend to focus on technological and methodological sophistication, in resource-constrained contexts organizational and cultural challenges emerge as determining factors.

Similarly, studies conducted in Brazil (Goncalves & Mantovani, 2022) report comparable patterns, with students showing high acceptance of digital technologies while identifying persistent institutional barriers to implementation. This convergence suggests that technological challenges in education transcend specific geographic contexts, manifesting as global patterns of resistance to institutional change.

However, a notable difference is that in Latin American contexts resistance is predominantly identified as a lack of teacher training, whereas in the Angolan context studied here, organizational

resistance emerges as the predominant factor, suggesting differentiated institutional dynamics.

From a theoretical standpoint, the results contribute to the theory of technological adoption in education (Rogers, 2003) by demonstrating that contextual and cultural factors can substantially modify typical patterns of resistance to change. The resistance identified does not correspond to the traditional profile of "innovators" versus "laggards," but rather reflects specific institutional dynamics in which organizational resistance outweighs individual factors of technological adoption. This theoretical perspective suggests that successful implementation of educational technologies requires differentiated approaches that consider the institutional and cultural particularities of each context, rather than applying universal models of technological adoption.

Regarding methodological limitations, the study presents several aspects that must be considered. First, the small sample size (n = 20) limits the statistical generalizability of the findings; second, the cross-sectional design does not allow for establishing definitive causal relationships between variables; third, the specific context of a single institution restricts extrapolation to broader populations. In addition, content-related limitations are identified: the exclusively student-centered focus omits crucial teacher perspectives for understanding implementation dynamics; likewise, the absence of actual learning metrics prevents evaluation of the pedagogical effectiveness of the technologies; finally, differentiating demographic variables such as gender, age, or prior technological experience were not considered, although they could influence perceptions and adaptation.

With respect to the geographic scope, the research is limited to a specific Angolan context, without considering regional variations within the country; moreover, the data collection period (second semester of 2024) may not capture seasonal or temporal variations in technological perceptions; finally, the specific socioeconomic characteristics of participants were not controlled, limiting understanding of mediating factors.

Despite these limitations, the study provides specific empirical evidence on technological perceptions in history education in Angola, addressing a significant gap in the regional academic literature. The findings shed light on technological adoption dynamics that challenge Western models of digital transformation in education. The results inform educational policymakers about the critical importance of addressing institutional resistance prior to implementing educational technology programs. The identification of organizational resistance as the main barrier suggests that interventions should focus on cultural and organizational change, rather than merely on the provision of technological resources.

In summary, the findings contribute to understanding how specific contextual factors mediate technological adoption in education, challenging universal models of digital educational transformation and suggesting the need for culturally appropriate approaches to technological implementation.

CONCLUSIONS

This research achieved its main objective by comprehensively analyzing the impact, potentialities, and challenges of using digital technologies in history teaching within the specific context of the Instituto Superior Politécnico Caála. The study revealed that students' perceptions of these technologies are predominantly positive, recognizing significant or moderate improvements in learning, while effective implementation faces predominantly organizational barriers.

The innovative potential of digital technologies in history education was demonstrated through the four categories analyzed: perceived effectiveness, technological preferences, perceived interactivity, and implementation challenges. These dimensions make it possible to understand both the opportunities and the limitations that shape the current scenario of technology-mediated history teaching.

Despite the advantages identified, significant challenges persist that hinder the full integration of these tools. One of the main obstacles is insufficient teacher training, which limits educators' ability to critically and effectively incorporate technologies into their pedagogical practices. Likewise, school infrastructure represents a structural barrier, especially in resource-limited regions, where access to devices and connectivity is uneven.

Another relevant aspect observed is the risk of

superficialization of historical content if digital technologies are used inappropriately or superficially. Easy access to rapid information may lead to the devaluation of in-depth reading and critical analysis. In addition, there is concern about excessive dependence on technological resources, which may compromise students' autonomy in knowledge construction.

For the use of digital technologies to effectively serve as a tool for innovation in history teaching, it is essential to develop public policies that promote continuous teacher training, democratize access to technologies, and create school environments that favor the integration of these tools into pedagogical practices. Furthermore, the development of specific pedagogical strategies is recommended to guide the critical and reflective use of technologies, ensuring that they function as instruments for deepening understanding rather than mere superficial engagement.

The study points to a growing trend in the incorporation of digital technologies in history teaching, especially with advances in digital platforms and artificial intelligence resources.

To fully harness this potential, the formation of collaborative networks among teachers is recommended, along with the development of high-quality digital teaching materials and the conduct of ongoing research to evaluate the impacts of these technologies on historical learning. Such collaboration should extend beyond institutional and geographic boundaries, creating communities of practice that share experiences, resources, and best practices.

Likewise, it is anticipated that the evolution of artificial intelligence and augmented and virtual reality technologies will open new possibilities for immersive history teaching, allowing students to "experience" historical events in contextualized and experiential ways. This evolution requires proactive preparation of educators and the continuous development of digital competencies.

In summary, the use of digital technologies in history teaching represents a unique opportunity for pedagogical innovation, capable of making instruction more engaging, accessible, and critical. However, its success depends on investments in training, infrastructure, and public policies that ensure conscious, ethical, and effective implementation.

It is essential to recognize that the successful integration of digital technologies in history teaching requires a holistic approach that considers not only technical aspects, but also the pedagogical, social, and cultural dimensions of the educational process. Technology should be viewed as a tool that enhances and enriches teaching, rather than as a replacement for traditional approaches that have proven effective in historical education.

Therefore, the integration of these technologies should be understood as a continuous process of improvement aimed at strengthening historical understanding and promoting quality education for all. This process requires collaboration among educators, students, families, educational institutions, and government bodies to create an educational ecosystem that fully leverages the opportunities offered by digital technologies.

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